

**Commonwealth of Kentucky**  
**Division for Air Quality**  
***PERMIT STATEMENT OF BASIS***

TITLE V PROPOSED PERMIT NO. V-05-050

ELECTRO CYCLE, INC.

MADISONVILLE, KY

September 28, 2006

SREENIVAS KESARAJU, REVIEWER

SOURCE I.D. #: 21-107-00121

SOURCE A.I. #: 1880

ACTIVITY #: APE20040001

**SOURCE DESCRIPTION:**

Electro Cycle, Inc. (Electro Cycle) is a secondary aluminum alloy ingots production plant. The source is located in Madisonville, KY and produces alloy ingots for the metal casting industry. The source melts and alloys a variety of recycled aluminum products to produce these ingots. The transforming of recycled aluminum scrap into alloy ingot at the source is a four-step process. These steps are: scrap receiving, scrap shredding, delacquering kiln (kiln) processing and induction furnace melting.

The source melts several types of scrap in the induction furnace. These include industrial scrap from can manufacturers that arrives densified either in a bale or a briquette. The source also processes loose extrusion turnings, wheel turnings and can process scrap forms, i.e. extrusion scrap, wheels, etc. Dealer scrap is the only scrap material fed into the kiln that contains the contaminants required for D/F formation. Most material used to make up the charge to the induction furnace is in the form of densified bales or briquettes. This material must be processed further, before it is ready to charge into the induction furnace. This processing begins at the #1 mill (Mac/Saturn-low speed-high torque mill) with 3 100 HP motors in tandem that drive the 2 hydraulic motors. The scrap is conveyed up and into the #2 mill (American Pulverizer-300 HP ring mill) for further sizing. Ferrous scrap is then removed magnetically and the milled scrap is conveyed to the kiln where the organic coatings are thermally removed and passed into the afterburner for ultimate destruction. The afterburner oxidizes the unburned hydrocarbon vapors in the gas stream that is vented from the kiln. The source uses an electrically operated induction furnace to provide the thermal energy to melt the aluminum scrap. The induction furnace has a capacity of 7 tons. Material is charged from the kiln to the induction furnace and the molten metal is poured into sow molds for solidification.

The particulate, acid gas and D/F emissions from the kiln are controlled by a baghouse that uses lime and activated carbon coated bags for additional acid gas and D/F control. The manufacturer specified particulate control efficiency is 99.3% and the afterburner control efficiency is 99.7% for hydrocarbon destruction. The kiln has a rated burner capacity of 6.4 mmBTU/hr and the afterburner has a rated capacity of 4.2 mmBTU/hr. The material exit temperature from the kiln is 750-850 °F and the gas temperature going to the afterburner is 250°F. The afterburner has an operating temperature of 1400-1450°F and an exit temperature of 313°F. The afterburner must operate at a temperature greater than 1400°F to destroy organic compounds. The induction furnace is also equipped with a bag house for particulate control with manufacturer specified control efficiency of 99.3%.

The potential to emit (as defined in 401 KAR 52:001, Section 1 (56)) of any single HAP is less than ten (10) tons per year and the combination of HAPs is less than twenty-five (25) tons per year. Therefore, the source is not a major source of HAPs. However, the provisions *40 CFR 63, Subpart RRR, National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production*, are applicable to area sources that have the potential to produce dioxin/furan (D/F) compounds.

Pursuant to 40 CFR Part 63.1500 (c), the requirements of 40 CFR 63, Subpart RRR, pertaining to dioxin and furan (D/F) emissions and associated operating, monitoring, reporting and recordkeeping requirements apply to the delacquering kiln and induction furnace. As such, the applicable final rule requirements of 40 CFR Part 63, Subpart RRR, promulgated on December 30, 2002, are incorporated into this permit.

This permit is the source's first plant-wide Title V operating permit. When the source applied for the Title V permit, their original annual capacity was 25000 tpy, however during the ongoing review of the Title V permit the source has requested to increase this capacity to 35000 tpy. This change was considered as a source modification and based on the emission calculations, the total PM from the modification was determined to be 16.68 tpy. In this source's case PM is considered equal to PM10, therefore PTE of PM10 greater than 15 tpy entailed the PSD review (i.e. 15 tpy significant emissions threshold). The source requested PM10 to be limited to less than 100 tons per year (90 TPY) source wide to make this source a minor source and get the modification exempted from PSD review.

The potential to emit (as defined in 401 KAR 52:001, Section 1 (56)) of PM10 and VOC is greater than one hundred (100) tons per year. Therefore, the source is a major source and is subject to the provisions of 401 KAR 52:020.

The issuance of a federally enforceable Title V operating permit requires a preliminary determination and public notice. The Division has done this. An advertisement was placed in the Madisonville Messenger on July 5, 2006. The thirty-day comment period has expired with no comments received.

## **COMMENTS:**

### **Type of control and efficiency:**

The source uses an afterburner and baghouse in series for controlling emissions from the delacquering kiln. The baghouse with lime and activated carbon injected into the ductwork for

particulate, acid gas and D/F control. The manufacturer specified particulate control efficiency is 99.3%. An afterburner with a rated capacity of 4.2 mmBTU/hr is used to control emissions from the kiln. The manufacturer specified control efficiency is 99.7%. The induction furnace is equipped with a baghouse for particulate control and the manufacturer specified control efficiency of 99.3%.

#### **Emission factors and their source:**

AP-42, Chapter 1.4, Tables 1.4-1, 2 and 3 were used to determine the natural gas combustion emissions from the kiln burner and afterburner. The process criteria pollutant emissions from the kiln, shredder and ring mill are based on engineering estimate that is consistent with that approved by DAQ in the most recent emissions inventory report. The HCl emissions from the kiln are based on stack test performed on June 29, 2000. Pursuant to 40 CFR 63.1505 (e), the D/F emissions from the kiln shall not exceed  $7 \times 10^{-5}$  gr/ton of feed/charge. This emission limit is used to estimate potential D/F emissions from the kiln.

#### **Existing Approvals:**

1. *Operating Permit No. O-93-006, issued on December 1, 1992*

This approval for the source specified terms and conditions for the operation of the delacquering kiln, induction furnace and low-speed shredder.

#### **New Activities/Equipment Receiving Approval:**

Pursuant to 401 KAR 52:020, Section 3(2), the following modification has been requested and approved during this review:

- (a) The source does not have any phosgene emissions. Therefore, condition 13 of Permit No. O-93-006 is not included in this approval.
- (b) During this permit review, the permittee requested to remove the processing rate limit for aluminum scrap since the source is subject to Title V requirements and does not want a throughput limit to preclude Title V requirements. The sourcewide potential hydrochloric acid emissions, based on the stack test performed on June 29, 2000, are 6.97 TPY (equivalent to 1.59 lbs/hour). Therefore, conditions 7, 9 and 13 of permit O-93-006 are not included in the Title V permit.
- (c) During this permit review, the permittee requested to remove the condition limiting the amount of coated aluminum scrap (Permit # O-93-006, Condition 10). The 40 CFR 63, Subpart RRR, test protocol submitted to the Division for Air Quality prior to the testing set the conditions under which the testing would be conducted, including coated scrap rates of much higher than 40 %. This testing demonstrated compliance with all applicable emission limitations at the higher coated aluminum scrap rate requested in letter dated February 14, 2004, with measured emissions far below the applicable standards. Due to this compliance demonstration, the facility has performed the compliance demonstration necessary to have this limit removed from the permit. Therefore, this condition is not included in the permit.

### **Applicable Regulations:**

(a) *401 KAR 59:010, New process operations*

The kiln, induction furnace, shredder and ring mill were installed after July 2, 1975. Therefore, the requirements of *401 KAR 59:010, new process operations*, apply to each affected facility. Pursuant to 401 KAR 59:010, particulate emissions from each facility, based on a maximum process weight rate of 4.9 tons/hr, shall not exceed 9.62 lb/hr. In addition the visible emissions from each furnace shall not be greater than 20 % opacity.

(b) *40 CFR 63, Subpart RRR, National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production*

The kiln and induction furnace are subject to the National Emission Standards for Hazardous Air Pollutants, 401 KAR 63:002, Section 3 (eee) (40 CFR 63, Subpart RRR). This source is an area source of HAP emissions, as defined at 40 CFR 63.2. The detailed requirements of this rule pertaining to an area source are incorporated into the permit. Following is a summary of the requirements:

- A) The provisions of 40 CFR 63 Subpart A - General Provisions, which are incorporated as 401 KAR 63:002 Section 3 (a), apply to the facilities described in this section except when otherwise specified in 40 CFR 63 Subpart RRR.
- B) Identification, emission limits and means of compliance shall be posted on all affected sources and emission units.
- C) The D/F emissions from the kiln shall not exceed  $7 \times 10^{-5}$  gr/ton of feed/charge. Electro Cycle has opted for this alternate emission limit pursuant to §63.1505(e).
- D) The D/F emissions from the induction furnace shall not exceed  $2.1 \times 10^{-4}$  gr/ton of feed/charge.
- E) Operate the affected equipment in accordance with the work practice/pollution prevention measures documented in the OM&M plan and within the parameter values or ranges established in the OM&M plan. The OM&M plan was submitted to KDAQ on March 1, 2003 and has been reviewed during this approval. Those OM&M plan requirements pertaining specifically to the equipment at this source are incorporated into the permit.
- F) For each secondary aluminum processing unit (SAPU), comply with the emission limit in §63.1505(k)(3). The permittee may demonstrate compliance with this emission standard by demonstrating that each emission limit within the SAPU is in compliance with the emissions limit of §63.1505(i)(3).
- G) The permittee shall comply with the capture/collection systems and feed/charge weight requirements in §63.1506(c) and §63.1506(d), respectively.
- H) The permittee shall comply with the operating requirements for the delacquering kiln as specified in §63.1506(g).

### **Non-Applicable Regulations:**

- (a) Pursuant to 401 KAR 61:165, Section 1, the requirements of this rule apply to each potroom group within a primary aluminum reduction plant commenced before October 23, 1974. This source is not a primary aluminum reduction plant and all facilities at this source are constructed after the classification date. Therefore, 401 KAR 61:165 does not apply.
- (b) Pursuant to 401 KAR 63:020, Section 1, the requirements of this rule are applicable to each affected facility which emits or may emit potentially hazardous matter or toxic substances as defined in 401 KAR 63:020, Section 2 (2), provided such emissions are not elsewhere subject to the provisions of the Kentucky administrative regulations. Since the requirements of 401 KAR 63:002 (Subpart RRR) are included in the permit for the affected facilities, 401 KAR 63:020 does not apply to this source.
- (c) The potential pre-control PM emissions from the delacquering kiln are greater than major source threshold and the kiln is subject to a SIP PM emission limit. However, the requirements of 40 CFR 64, *Compliance Assurance Monitoring*, are not included in the permit for the kiln because this approval is a first issue Title V permit and CAM plan shall be due with the first Title V renewal application.

### **Source Status**

This existing source is not a major stationary source for PSD review because this type of operation is one of the twenty-eight (28) listed source categories under 401 KAR 51:017 and no attainment pollutant is emitted at a rate of 100 tons per year or more after federally enforceable controls and limits.

### **Credible Evidence:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.